

Borehole

50-02-05**Log Event A****Borehole Information**

Farm : <u>T</u>	Tank : <u>T-102</u>	Site Number : <u>299-W10-123</u>
N-Coord : <u>43,596</u>	W-Coord : <u>75,723</u>	TOC Elevation : <u>672.34</u>
Water Level, ft : <u>84.1</u>	Date Drilled : <u>3/31/1974</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness, in. : <u>0.237</u>	ID, in. : <u>4</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>91</u>	
Type : <u>Steel-welded</u>	Thickness, in. : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>91</u>	

Cement Bottom, ft. : 91 Cement Top, ft. : 0

Borehole Notes:

Borehole 50-02-05 was originally drilled in March 1974 and completed at 91 ft using 6-in.-diameter casing. In February 1981, the original 6-in. casing was perforated from 0 to 20 ft and 84 to 86 ft, a 4-in. casing was installed inside the 6-in. casing, and the annular space was filled with grout.

The zero reference for the SGLS was the top of the 4-in. casing, which is approximately even with the ground surface.

Equipment Information

Logging System : <u>2B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency : <u>35.0 %</u>
Calibration Date : <u>10/1997</u>	Calibration Reference : <u>GJO-HAN-14</u>	Logging Procedure : <u>MAC-VZCP 1.7.10-1</u>

Logging Information

Log Run Number : <u>1</u>	Log Run Date : <u>06/10/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>38.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>06/11/1998</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>85.5</u>	Counting Time, sec.: <u>200</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>41.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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Log Run Number :	<u>3</u>	Log Run Date :	<u>06/11/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>42.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>R</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>37.5</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Log Run Number :	<u>4</u>	Log Run Date :	<u>06/11/1998</u>	Logging Engineer:	<u>Alan Pearson</u>
Start Depth, ft.:	<u>70.0</u>	Counting Time, sec.:	<u>200</u>	L/R : <u>L</u>	Shield : <u>N</u>
Finish Depth, ft. :	<u>58.0</u>	MSA Interval, ft. :	<u>0.5</u>	Log Speed, ft/min.:	<u>n/a</u>

Logging Operation Notes:

This borehole was logged in four log runs. Log run three (37.5 to 42 ft) was logged using 200-s real time because of excessive dead time. Log run four (58 to 70 ft) was a repeat log run performed for quality assurance purposes. The total logging depth achieved by the SGLS was 85.5 ft. During logging, this borehole contained standing water below 84.4 ft.

Analysis Information

Analyst : R.R. SpatzData Processing Reference : MAC-VZCP 1.7.9Analysis Date : 09/01/1998**Analysis Notes :**

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

The casing correction factor for a 0.50-in.-thick steel casing was applied to the concentration data during the analysis process. This casing correction factor was applied because it most closely matched the 0.517-in. total combined thickness of the 4-in. and 6-in. casings. A grout correction was not made because none is available. A water correction was not applied because none is available for 4-in.-diameter boreholes. Use of this casing correction factor will cause radionuclide concentrations to be underestimated.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.



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The interval between 58 and 70 ft was relogged as an additional quality check and to demonstrate the repeatability of the radionuclide concentration measurements made by the SGLS.

Two plots showing historical gross gamma-ray data collected from 1980 to 1991 and 1990 to 1994 are included.

A plot showing the average gross gamma-ray count rate from 49 to 53 ft and 59 to 70 ft is also included.

Results/Interpretations:

The radionuclide concentrations identified in this section are reported as apparent concentrations only and are underestimated.

The man-made radionuclides Cs-137, Co-60, and Eu-154 were detected by the SGLS around this borehole. Cs-137 contamination was detected continuously from the ground surface to 1.5 ft at apparent concentrations ranging from 0.2 to 8 pCi/g. Cs-137 contamination was detected intermittently from 25.5 to 35 ft and 44.5 to 53 ft at apparent concentrations ranging between 0.2 and 0.6 pCi/g. Cs-137 contamination occurs continuously from 37 to 42.5 ft at apparent concentrations ranging from 0.4 pCi/g to a peak value of 1,850 pCi/g at 40 ft. The apparent Cs-137 concentration detected at 77 ft was 0.5 pCi/g.

Co-60 contamination was detected continuously from 49 to 73 ft at apparent concentrations ranging from 0.6 pCi/g to just over 2 pCi/g. The maximum apparent Co-60 concentration for this borehole was 2.4 pCi/g detected at 61.5 ft.

Eu-154 contamination was detected at 38.5 ft at an apparent concentration of 0.36 pCi/g.

The K-40 concentrations range between 6 and 10 pCi/g from the ground surface to 38 ft. Between 38 and 50 ft, the K-40 concentrations increase to about 12 pCi/g. Below 50 ft, the K-40 concentrations decrease to about 9 pCi/g and then steadily increase to about 12 pCi/g at the bottom of the logged interval (85.5 ft). Below 81 ft, the KUT concentrations increase.